

Table of contents

1 Map-based mobile services	1
Liqu MENG and Tumasch REICHENBACHER	1
1.1 Background	1
1.2 Mobile maps and their predecessors	2
1.3 Affordances of maps	5
1.4 Research challenges of designing map-based mobile services	6
1.5 About the book	8
1.6 References	8
 2 Portrayal and Generalisation of Point Maps for Mobile Information Services	 11
Alistair EDWARDES, Dirk BURGHARDT, Robert WEIBEL	11
2.1 Introduction	11
2.2 Context of research	12
2.3 Maps as a representational medium	13
2.4 Map types and multiple views	14
2.5 Symbolisation and spatial relations	16
2.5.1 Space distortion from symbolisation in data conflation	17
2.5.2 Abstractions of spatial relations	19
2.6 Geographic space	21
2.7 Generalisation	22
2.7.1 Generalisation operators for point maps	22
2.8 Conclusions	27
Acknowledgements	28
References	28
 3 Activity and Context - A Conceptual Framework for Mobile Geoservices	 31
Doris DRANSCH	31
3.1 Mobile Geoservices	31
3.2 Concepts of activity and context	32
3.2.1 Activity	33
3.2.2 Activity and Mobile Geoservices	36
3.2.3 Context	39
3.2.4 Context and Mobile Geoservices	40
3.3 Conclusion	41
References	41
 4 Effectiveness and efficiency of tourism maps in the World Wide Web and their potential for mobile map services	 45
Frank DICKMANN	45
4.1 Introduction	45
4.2 Web maps and tourism	46

4.3 Empirical analysis.....	47
4.4 First results.....	49
4.4.1 Comprehension of overall topographic structures.....	50
4.4.2 Assimilation of complex spatial information.....	51
4.4.3 Assimilation of detailed geographic information.....	52
4.5 Conclusion.....	53
References.....	54
5 The Cognitive Reality of Schematic Maps	57
Alexander KLIPPEL, Kai-Florian RICHTER, Thomas BARKOWSKY, Christian FREKSA.....	57
5.1 Introduction.....	57
5.2 Schematisation and Generalisation	58
5.3 Maintaining Qualitative Information	62
5.4 Aspects of Human Spatial Cognition.....	65
5.4.1 Wayfinding Choremes	65
5.4.2 Focus maps	67
5.4.3 Chorematic focus maps.....	68
5.4.4 Multimodality	68
5.5 Applications.....	70
5.6 Conclusions.....	70
References.....	71
6 Adaptive Visualisation of Landmarks using an MRDB.....	75
Birgit ELIAS, Mark HAMPE, Monika SESTER.....	75
6.1 Introduction.....	75
6.2 Mobile Navigation	76
6.2.1 Context-dependent mobile navigation	76
6.2.2 Focus on moving mode.....	76
6.3 Route-dependent generation of landmarks.....	79
6.3.1 Existing databases for landmark detection.....	80
6.3.2 Extraction procedure of potential landmarks	80
6.3.3 Generation of route-specific landmarks	81
6.4 Scale-dependent visualisation of landmarks	82
6.4.1 Generating multiple resolutions for the MRDB.....	82
6.4.2 Adaptive visualisation of landmark objects by re-generalisation.....	83
6.4.3 Emphasizing important objects.....	83
6.4.4 Using MRDB for emphasizing important objects.....	85
6.5 Summary and Outlook	86
Acknowledgement	87
References.....	87
7 Ego centres of mobile users and egocentric map design	89
Liqui MENG.....	89
7.1 Introduction.....	89
7.1.1 Usability of the egocentric mobile map	92

7.1.2 Necessity of designing egocentric mobile maps	92
7.2 Detecting the ego centre of a mobile map user	94
7.2.3 <i>Acquisition of scenarios</i>	96
7.3 Designing egocentric map.....	98
7.4 Concluding remarks	105
7.5 Acknowledgement	105
7.6 References.....	105
8 Adaptation to Context – A Way to Improve the Usability of Mobile Maps	109
L. Tiina SARJAKOSKI, Annu-Maaria NIVALA.....	109
8.1 Introduction.....	109
8.2 Preliminary User Requirements Based on Field Testing	111
8.2.1 Aim of the field study and test method	112
8.2.2 Test users, material and equipment	112
8.2.3 Pre-defined tasks	113
8.2.4 Results.....	114
8.3 Categorisation of Contexts in Mobile Map Applications.....	116
8.3.1 Definitions of context.....	116
8.3.2 Contexts relevant for mobile map usage situation	117
8.3.3 Summary of context categorisation.....	119
8.4. Implementation of the GUI and Adaptive Maps	120
8.4.1 Personalisation of the service.....	120
8.4.2 Adaptive seasonal maps	121
8.5. Further Development of Context-Aware Adaptive Maps	124
References.....	124
9 Focalizing Measures of Salience for Wayfinding.....	127
Stephan WINTER ¹ , Martin RAUBAL ² , Clemens NOTHEGGER ³	127
9.1 Introduction.....	127
9.2 The Measure of Salience.....	128
9.3 Focalizing in Route Piloting.....	130
9.3.1 Mode of travelling.....	131
9.3.2 Role of the traveller.....	131
9.3.3 Environment of the traveller	131
9.3.4 Spatial and cognitive abilities of the traveller	132
9.4 Focalizing by Weighting the Measures of Salience	132
9.4.1 Specifications by the provider.....	133
9.4.2 Specifications by the user.....	133
9.4.3 Learning from behaviour.....	134
9.5 Test of Weighted Salience	134
9.6 Results.....	136
9.7 Conclusions and Outlook	139
Acknowledgements.....	140
References.....	140

10 Adaptive egocentric maps for mobile users	143
Tumasch REICHENBACHER	143
10.1 Introduction.....	143
10.2 Geoservices for everyday activities	144
10.3 Context-adaptation in geoservices	148
10.3.1 Context model for mobile geovisualisation services.....	148
10.3.2 Adapting geovisualisation to mobile usage context parameters	150
.....	150
10.3.3 The process of map adaptation.....	152
10.4 Egocentric maps.....	155
10.5 Adapting to mobile user activities	156
10.6 Conclusions.....	160
References.....	160
11 Cartographic Location Based Services.....	163
Georg GARTNER, Susanne UHLIRZ.....	163
11.1 Introduction.....	163
11.2 Elements of Cartographic LBS	163
11.2.1 Positioning	164
11.2.2 Modelling and Presentation of Information	164
11.2.3 Users and Adaptation.....	166
11.3 Research questions in the context of cartographic LBS.....	166
11.3.1 Integrative Positioning.....	166
11.3.2 Route Information Systems.....	167
11.3.3 Information Presentation and Visualisation	167
11.4 Selected contributions to concepting cartographic LBS	168
11.4.1 Active Landmarks.....	168
11.4.2 Presenting routes by various presentation forms.....	171
11.4.3 Cartographic support for wayfinding	172
11.5 Summary.....	173
References.....	174
12 XML in Service Architectures for Mobile Cartographic Applications ...	177
Lassi LEHTO, Tapani SARJAKOSKI.....	177
12.1 Introduction.....	177
12.2 XML Basics	178
12.2.1 General.....	178
12.2.2 XML Schema.....	180
12.2.3 XLink	181
12.2.4 XSLT	181
12.3 XML in Spatial Data Processing.....	182
12.3.1 Data encoding, GML	182
12.3.2 Map visualisation, SVG	182
12.3.3 Spatial data modelling and validation, XML Schema.....	183
12.3.4 Spatial relationships, XLinks	183
12.3.5 Spatial data transformations, XSLT	183

12.4	Architecture for Mobile Map Services	185
12.4.1	Architecture layers	185
12.4.2	Standardised interfaces.....	187
12.4.3	Use of XML in the architecture.....	188
12.5	Service Architecture in the GiMoDig project	189
12.5.1	General	189
12.5.2	Query processing.....	191
12.5.3	Response processing	191
12.6	Other related studies.....	193
12.7	Discussion and conclusion	193
	References.....	194
13	A Survey of Map-based Mobile Guides	197
	Jörg BAUS ¹ , Keith CHEVERST ² , Christian KRAY ²	197
13.1	Introduction.....	197
13.2	Mobile Guide Systems: A Representative Survey	199
13.3	COMPARISON/ANALYSIS.....	206
13.3.1	Positioning	207
13.3.2	Situational factors	207
13.3.3	Adaptation capabilities.....	208
13.3.4	Interface and user interaction	209
13.3.5	Use of maps.....	210
13.3.6	Architecture.....	211
13.3.7	Future directions	212
13.4	Conclusion	213
	Acknowledgements.....	213
	References.....	213
14	Position Determination of Reference Points in Surveying	217
	Leonhard DIETZE, Klaus BÖHM	217
14.1	Introduction and state of the art	217
14.1.1	Locating reference points without technical support.....	217
14.1.2	Current approaches using Location-based Services (LBS)	218
14.2	Requirements for the 'Mobile Reference Point Localisation' support service.....	219
14.3	The MRPL service concept.....	220
14.3.1	The structured vector format	220
14.3.2	Integration of the user position with GPS	221
14.3.3	Technical background of position determination using GPS	222
14.4	Realisation.....	222
14.4.1	Architecture.....	222
14.5	The MRPL prototype	226
14.6	Evaluation of the MPRL prototype	227
14.6.1	Test scenario	227
14.6.2	Results.....	228
14.6.3	Evaluation	229

14.7 Summary and outlook	230
Acknowledgements.....	230
References.....	230
15 Dynamic 3D Maps for Mobile Tourism Applications	233
Arne SCHILLING ¹ , Volker COORS ² , Katri LAAKSO ³	233
15.1 Feasibility and Advantages of 3D Maps	233
15.2 The TellMaris Project	234
15.3 Integration in a Distributed Environment	236
15.4 Development of the iPAQ Prototype	237
15.4.1 Presentation Strategies	238
15.4.2 Connecting Tourist Data and GIS Data	239
15.4.3 Spatial Database for 3D Geodata	240
15.4.4 Technical Results	242
15.5 Prototype Evaluation.....	242
15.5.1 Settings and objectives.....	242
15.5.2 Results.....	243
References.....	244
16 Designing electronic maps: an ethnographic approach	247
Barry BROWN ¹ , Eric LAURIER ²	247
16.1 Introduction.....	247
16.2 Motivation.....	248
16.3 Methods	249
16.4 Using Maps	250
16.4.1 Maps as collaborative artifacts.....	250
16.4.2 Using a map <i>in situ</i>	251
16.4.3 Getting from a to b.....	253
16.4.4 Maps for pre-visiting an planing	254
16.5 Designing map technologies	256
16.5.1 Collaborative map use.....	256
16.5.2 Combining electronic maps and guidebooks	257
16.5.3 Supporting pre visiting an planning	258
16.6 Conclusion	261
Acknowledgements.....	261
References.....	262
INDEX.....	265

Map-based Mobile Services

Theories, Methods and Implementations

Meng, L.; Zipf, A.; Reichenbacher, T. (Eds.)

2005, XII, 260 p. With CD-ROM., Hardcover

ISBN: 978-3-540-23055-7